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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/824,936	04/03/2001	Jacques Schmitt	H37-091 DIV	9938

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EXAMINER	
CROWELL, ANNA M	
ART UNIT	**PAPER NUMBER**
1763	

DATE MAILED: 04/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/824,936	SCHMITT, JACQUES	
	Examiner	Art Unit	
	Michelle Crowell	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 December 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) *2 and 9-12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 3, 4,and 6-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3, 4, and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanada (Japanese Patent Publication 08-186094) in view of Shang et al. (U.S. 6,177,023) and Collins et al. (U.S. 5,210,466).

Referring to Drawings 1 and 2 and the abstract, Hanada discloses a capacitively coupled radio frequency plasma reactor 19 comprising: at least two electrically conductive electrodes 12 and 21 spaced from each other, each electrode having an external surface, an internal process space 11 enclosed between the electrodes, a gas providing means 16 for providing the internal process space with a reactive gas, at least one radio frequency generator 29 connected to at least one of the electrodes, at a connection location, for generating a plasma discharge in the process space, a means 26 to evacuate the reactive gas from the reactor, at least one substrate 1 defining one limit of the internal process space, to be exposed to the processing action of the plasma discharge, the at least one substrate extends along a general surface and is arranged between the electrodes, at least one dielectric layer 21a has at least one non planar-shaped external surface (Fig. 2 and abstract) extending outside the internal process space, the dielectric layer being a capacitor that is electrically in series with the substrate and the plasma, and the dielectric layer having a capacitance per unit surface values which are not uniform along at least one direction of

the general surface, for generating a given distribution profile, especially for compensating a process non uniformity in the reactor.

Hanada fails to teach a radio frequency generator for frequencies greater than 13.56 MHz and at least one substrate with a largest dimension of at least 0.7m.

Referring to column 4, lines 26-47, Collins et al. discloses a capacitively coupled radio frequency plasma reactor using a radio frequency generator which applies frequencies greater than 13.56 MHz (50-800 MHz) since higher frequencies provide commercially viable processing rates and substantial reduction in sheath voltages. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the radio frequency generator of Hanada to apply frequencies greater than 13.56 MHz as taught by Collins et al. since higher frequencies provide commercially viable processing rates and substantial reduction in sheath voltages.

Referring to column 5, lines 58-63, Shang et al. teaches a plasma reactor for processing a substrate with a largest dimension up to 1m. It is well known in the art to scale up or down an apparatus to accommodate the desired substrate size. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus of Hanada with a substrate having a largest dimension up to 1m since it is well known in the art to scale up or down an apparatus to accommodate the desired substrate size. Additionally, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device (In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984)).

With respect to claim 3, the dielectric layer 21a has a thickness "a" along a direction perpendicular to the general surface of the substrate 1, the thickness being non uniform along the dielectric layer, so that the reactor has a location-dependent capacitance per unit surface values along the general surface (Fig. 2 and abstract).

With respect to claim 4, the dielectric layer 21a is the thickest in front of the location in the process space 11 which is the furthest away from the connection location where the radio frequency generator 29 is connected to the at least one electrode and the thickness decreases from the process space location as the distance between the process space location and the connection location on the corresponding electrode decreases (Fig. 1 and abstract).

With respect to claim 6, at least one of the electrodes 21 has a non planar-shaped surface facing the substrate 1 (Figs. 1 and 2).

With respect to claim 7, the dielectric layer 21a is locally delimited by a surface of one of the electrodes 21, and the delimitation surface of the one electrode is curved (Fig. 1 and 2).

With respect to claim 8, the dielectric layer comprises a solid dielectric layer (Figs. 1, 2 and abstract).

3. Claims 1, 3, 4, and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanada (Japanese Patent Publication 08-186094) in view of Shang et al. (U.S. 6,177,023) and Sato et al. (6,199,505)

Referring to Drawings 1 and 2 and the abstract, Hanada discloses a capacitively coupled radio frequency plasma reactor 19 comprising: at least two electrically conductive electrodes 12 and 21 spaced from each other, each electrode having an external surface, an internal process space 11 enclosed between the electrodes, a gas providing means 16 for providing the internal

process space with a reactive gas, at least one radio frequency generator 29 connected to at least one of the electrodes, at a connection location, for generating a plasma discharge in the process space, a means 26 to evacuate the reactive gas from the reactor, at least one substrate 1 defining one limit of the internal process space, to be exposed to the processing action of the plasma discharge, the at least one substrate extends along a general surface and is arranged between the electrodes, at least one dielectric layer 21a has at least one non planar-shaped external surface (Fig. 2 and abstract) extending outside the internal process space, the dielectric layer being a capacitor that is electrically in series with the substrate and the plasma, and the dielectric layer having a capacitance per unit surface values which are not uniform along at least one direction of the general surface, for generating a given distribution profile, especially for compensating a process non uniformity in the reactor.

Hanada fails to teach a radio frequency generator for frequencies greater than 13.56 MHz and at least one substrate with a largest dimension of at least 0.7m.

Referring to column 2, lines 37-65, column 4, line 40-column 5, line 40, Sato et al. discloses a capacitively coupled radio frequency plasma reactor designed to use a radio frequency generator which applies frequencies greater than 13.56 MHz (30-300 MHz) (col. 2, lines 53-56) and that processes a substrate with a largest dimension of at least 0.7m (1 m) (col. 2, lines 37-44) since it is important to uniformly process large substrates at high frequencies with a reduced weight, dimension, and cost to the overall apparatus. Additionally, higher frequencies provide commercially viable processing rates and substantial reduction in sheath voltages and larger substrates yield increased product throughput. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to design the reactor of Hanada to apply

frequencies greater than 13.56 MHz and accommodate at least one substrate with a largest dimension of at least 0.7m. as taught by Sato et al. since there is a growing demand in industry to uniformly process large substrates at high frequencies with a reduced weight, dimension, and cost to the overall apparatus. Additionally, higher frequencies provide commercially viable processing rates and substantial reduction in sheath voltages and larger substrates yield increased product throughput.

Moreover, referring to column 5, lines 58-63, Shang et al. teaches a plasma reactor for processing a substrate with a largest dimension up to 1m. It is well known in the art to scale up or down an apparatus to accommodate the desired substrate size. Additionally, it is well known in the art to scale up/down the power in order to accommodate the desired substrate size (col. 6, lines 58-60). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus of Hanada with a substrate having a largest dimension up to 1m with appropriate power level since it is well known in the art to scale up or down an apparatus to accommodate the desired substrate size. Additionally, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device (In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984)).

With respect to claim 3, the dielectric layer 21a has a thickness "a" along a direction perpendicular to the general surface of the substrate 1, the thickness being non uniform along the

dielectric layer, so that the reactor has a location-dependent capacitance per unit surface values along the general surface (Fig. 2 and abstract).

With respect to claim 4, the dielectric layer 21a is the thickest in front of the location in the process space 11 which is the furthest away from the connection location where the radio frequency generator 29 is connected to the at least one electrode and the thickness decreases from the process space location as the distance between the process space location and the connection location on the corresponding electrode decreases (Fig. 1 and abstract).

With respect to claim 6, at least one of the electrodes 21 has a non planar-shaped surface facing the substrate 1 (Figs. 1 and 2).

With respect to claim 7, the dielectric layer 21a is locally delimited by a surface of one of the electrodes 21, and the delimitation surface of the one electrode is curved (Fig. 1 and 2).

With respect to claim 8, the dielectric layer comprises a solid dielectric layer (Figs. 1, 2 and abstract).

Response to Arguments

4. Applicant's arguments filed December 27, 2004 have been fully considered but they are not persuasive.

5. Applicant has argued that it not obvious nor logical to scale up the Collins and Hanada structure to accommodate the larger substrates of Shang et al. and moreover there is no support for this combination from the references; however, Shang et al. clearly teaches it is well known to scale up/down an apparatus (i.e. chamber size, power level, substrate holder) in order to accommodate a large sized substrate (col. 5, lines 60-63, col. 6, 55-67). Additionally, in column

2, lines 31-34, Sato et al. teaches it is conventional known to scale up an apparatus in order to accommodate a larger substrate. Thus, to process a larger substrate in the apparatus of Hanada, it is obvious to scale the apparatus of Hanada based on the teachings of Shang et al. Therefore, the teachings of Hanada '094in view of Collins et al. '466 and Shang et al. '023 satisfy the claimed requirements.

6. Applicant has argued that Shang fails to address the standing wave issue or suggest a solution for the standing wave problem associated with processing large substrates at high frequencies; however, it should be noted that in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the standing wave issue or suggest a solution for the standing wave problem) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Additionally, the claims are directed towards an apparatus invention, and "apparatus claims
cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990). In the instant case, the structure of the claimed requirement is satisfied by the rejection of Hanada '094in view of Collins et al. '466 and Shang et al. '023 and furthermore, as stated above, Shang et al. (col. 5, lines 60-63, col. 6, 55-67) and Sato et al. (column 2, lines 31-34) clearly teaches it is well known to scale up/down an apparatus (i.e. chamber size, power level, substrate holder) in order to accommodate a large sized substrate in.

7. Applicant has requested that the Examiner identify the motivation to use higher frequencies in the references of Collins et al. and Sato et al. In the abstract of Collin et al. '466 and col. 1, lines 60-64 of Sato et al., it teaches the motivation that higher frequencies provide commercially viable processing rates and substantial reduction in sheath voltages.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (571) 272-1432. The examiner can normally be reached on M-F (9:30 -6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMC
04-12-05

JEFFRIE R. LUND
PRIMARY EXAMINER